

CLAIMS

1. Apparatus, comprising a moulding unit (3; 3a) having a punch (5; 5a) and a cavity mould (4; 4a) movable along a path between an open position in which said punch (5; 5a) and said cavity mould (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5; 5a) and said cavity mould (4; 4a) are aligned and interact to form an item by pressing said dose (D), said punch (5; 5a) being kept at a height which is not greater than the height of said cavity mould (4; 4a) along said path, the apparatus further comprising a supporting arrangement for supporting said dose (D), said supporting arrangement extending externally of said cavity mould for supporting said dose (D) between said punch (5; 5a) and said cavity mould (4; 4a) in said open position.
2. Apparatus according to claim 1, wherein said punch (5) is placed under said cavity mould (4).
3. Apparatus according to claim 1, wherein said punch (5a) and said cavity mould (4a) are placed on a common horizontal plane.
4. Apparatus according to any preceding claim, wherein said cavity mould (4) is movable between said closed position and said open position.
5. Apparatus according to any preceding claim, wherein said punch (5; 5a) is movable between said closed position and said open position.
6. Apparatus according to any preceding claim, wherein said moulding unit (3; 3a) is mounted on a rotating carousel (2).
7. Apparatus according to any preceding claim, wherein said supporting arrangement is driven by cam means (19; 19a).
8. Apparatus according to claim 7, wherein said cam means (19a) is fixed to said punch (5a).
9. Apparatus according to claim 7, wherein said cam means (19) is fixed to said cavity mould (5).

10. Apparatus according to claim 7, as appended to claim 6, wherein said cam means (19) is fixed to said carousel (2).
- 5 11. Apparatus according to any preceding claim, wherein said supporting arrangement comprises a pair of rods (11) connected to a respective pair of levers (16a, 16b) hinged at a base body, each lever (16a) of said pair of levers (16a, 16b) being connected to the other lever (16b) of said pair of levers (16a, 16b) by a connection
10 rod (25).
12. Apparatus according to any preceding claim, wherein said supporting arrangement can be oscillated by gear means (38, 39).
- 15 13. Apparatus according to any preceding claim, wherein said supporting arrangement comprises a supporting member (11; 11a) which is movable between a dose-receiving configuration in which said supporting member (11; 11a) is so arranged as to retain said dose (D) and a dose-delivering configuration in which said supporting member
20 (11; 11a) is so arranged as to deliver said dose (D) to said moulding unit (3; 3a).
14. Apparatus according to claim 13, as appended to any one of claims 7 to 10, wherein said cam means (519) has a first portion (560) for driving said supporting member
25 and a further supporting member in said dose-receiving configuration and a second portion (561) for driving said supporting member and said further supporting member in a dose-pinching configuration in which said dose (D) is pinched between said supporting member and said further
30 supporting member, said second portion (561) being adjacent to said first portion (560).
15. Apparatus according to claim 13 or 14, wherein said supporting member (11a) can be oscillated parallelly to an axis along which said punch (5a) and said cavity mould
35 (4a) are movable.
16. Apparatus according to any one of claims 13 to 15,

wherein said supporting member is made from porous material.

17. Apparatus according to any one of claims 13 to 16, wherein said supporting member comprises a tubular supporting member (211) having holes (212a) through which a fluid can be injected toward said dose.

18. Apparatus according to any one of claims 13 to 17, wherein said supporting member is made from thermally substantially non-conductive material.

19. Apparatus according to any one of claims 13 to 18, wherein said supporting member (11a, 51) is substantially L-shaped.

20. Apparatus according to any one of claims 13 to 19, wherein said supporting member is coated by a substantially non stick material.

21. Apparatus according to any preceding claim, wherein said supporting arrangement is mounted on said punch (5).

22. Apparatus according to any one of claims 1 to 20, wherein said supporting arrangement is mounted on said cavity mould (4a).

23. Apparatus according to any preceding claim, wherein said supporting arrangement is actuated along said path independently of said cavity mould (4) and/or said punch (5).

24. Apparatus according to any one of claims 7 to 23, as appended to claim 6, wherein said supporting arrangement is mounted on said carousel (2).

25. Apparatus according to any preceding claim, and further comprising a dose-delivering mouth (48; 48a; 48b) of an extruder interposed between said punch (5) and said cavity mould (4) in said open position.

26. Apparatus according to claim 25, wherein a severing arrangement (46; 49; 49a) co-operates with said dose-delivering mouth (48; 48a; 48b) so as to sever said dose from said extruder.

27. Apparatus according to claim 26, wherein said severing

arrangement (46; 49; 49a) is mounted on said moulding unit (3; 3a).

28. Apparatus according to claim 26 or 27, wherein said severing arrangement (46) is rotatable around a
5 respective axis (Z2).

29. Apparatus according to claim 28, wherein said severing arrangement (46) is driven by an independent motor unit.

30. Apparatus according to any one of claims 26 to 29, as claim 25 is appended to any one of claims 13 to 20,
10 wherein said severing arrangement (46; 49; 49a) is provided with a blade (46) connected to said supporting member (11).

31. Apparatus according to any one of claims 26 to 30, wherein said severing arrangement is provided with a
15 knife (49; 49a) mounted on said punch (5; 5a) or on said cavity mould (4; 4a).

32. Apparatus according to any preceding claim, wherein in said open position in which said punch and said cavity mould are distanced apart from each other a plurality of
20 doses (Da, Db; 309, 310) of plastics is placed between said punch and said cavity mould, so as to interact when said punch and said cavity mould are brought in said closed position.

33. Apparatus, comprising a moulding unit (3; 3a) having a
25 punch (5; 5a) and a cavity mould (4; 4a) movable between an open position in which said punch (5; 5a) and said cavity mould (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5; 5a) and said
30 cavity mould (4; 4a) interact to form an item by pressing said dose (D), a supporting arrangement extending externally of said cavity mould (4; 4a) for supporting said dose (D) between said punch (5; 5a) and said cavity
35 mould (4; 4a) in said open position, wherein said supporting arrangement can be oscillated by movable cam means (19; 19a).

34. Apparatus according to claim 33, wherein said cam means (19) is fixed relative to said punch (5) . .
35. Apparatus according to claim 33, wherein said cam means (19; 19a) is fixed relative to said cavity mould (4; 4a) .
- 5 36. Apparatus, comprising a pair of rods (11) for supporting a dose of plastics between a punch and a cavity mould, said pair of rods (11) being connected to a respective pair of levers (16a, 16b) hinged at a base body, each lever (16a) of said pair of levers (16a, 16b) being
10 connected to the other lever (16b) of said pair of levers (16a, 16b) by a connection rod (25) .
37. Apparatus according to claim 36, and further comprising cam means (28, 29) associated to a lever (16a) of said pair of levers (16a, 16b) to move said pair of levers
15 (16a, 16b) between a dose-receiving position in which a dose (D) of plastics is received on said pair of rods (11) and a dose delivering-position in which said dose (D) is delivered between said punch and said cavity mould.
- 20 38. Apparatus according to claim 37, wherein said connection rod (25) is hinged to an end portion of said lever (16a) and to an intermediate portion of a further lever (16b) of said pair of levers (16a, 16b) .
39. Apparatus, comprising a moulding unit (3a) having a punch
25 (5a) and a cavity mould (4a) movable along an axis between an open position in which said punch (5a) and said cavity mould (4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5a) and said
30 cavity mould (4a) interact to form an item by pressing said dose (D), a supporting arrangement (11a, 216) for supporting said dose (D) between said punch (5a) and said cavity mould (4a) and having a member (11a) which can be oscillated parallelly to said axis.
- 35 40. Apparatus according to claim 39, wherein said axis is substantially horizontal and said member (11a) is

oscillatable on a substantially horizontal plane.

41. Apparatus according to claim 39 or 40, wherein said member (11a) is fixed to a lever (216) capable of actuating said member (11a) between said open position and said closed position, said lever (216) comprising a first arm (50) substantially parallel to said member (11a) and a second arm (51) joining said first arm (50) and said member (11a).
42. Apparatus according to claim 41, wherein said second arm (51) is substantially perpendicular to said first arm (50).
43. Apparatus, comprising a moulding unit having a punch and a cavity mould movable between an open position in which said punch and said cavity mould are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and said cavity mould interact to form an item by pressing said dose, a supporting arrangement (111) for supporting said dose between said punch and said cavity mould, wherein said supporting arrangement can be oscillated by gear means (38, 39).
44. Apparatus according to claim 43, wherein said moulding unit is mounted on a carousel rotatable around an axis, said gear means (38, 39) comprising first gear means (38) associated to said moulding unit and second gear means (39) stationary with respect to said carousel.
45. Apparatus according to claim 44, wherein said supporting arrangement comprises a supporting member (111) oscillatable on a plane substantially perpendicular to said axis.
46. Apparatus, comprising a moulding unit having a punch and a cavity mould movable along an axis between an open position in which said punch and said cavity mould are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and said cavity mould interact to form an item

by pressing said dose, a supporting arrangement for supporting said dose between said punch and said cavity mould, said supporting arrangement comprising a supporting member of porous material.

- 5 47. Apparatus, comprising a moulding unit having a punch and a cavity mould movable along an axis between an open position in which said punch and said cavity mould are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which
10 said punch and said cavity mould interact to form an item by pressing said dose, a supporting arrangement for supporting said dose between said punch and said cavity mould, said supporting arrangement comprising a tubular supporting member (211) having holes (212a) through which
15 air can be injected toward said dose (Da, Db).
48. Apparatus, comprising a moulding unit having a punch and a cavity mould movable along an axis between an open position in which said punch and said cavity mould are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which
20 said punch and said cavity mould interact to form an item by pressing said dose, a supporting arrangement for supporting said dose between said punch and said cavity mould, said supporting arrangement comprising a supporting member of thermally substantially non-
25 conductive material.
49. Apparatus, comprising a moulding unit (3; 3a) having a punch (5; 5a) and a cavity mould (4; 4a) movable between an open position in which said punch (5; 5a) and said
30 cavity mould (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5; 5a) and said cavity mould (4; 4a) interact to form an item by pressing said dose (D), a dose-delivering mouth (48; 48a; 48b) of
35 an extruder being interposed between said punch (5; 5a) and said cavity mould (4; 4a) in said open position.

50. Apparatus according to claim 49, wherein a severing arrangement (46; 49; 49a) co-operates with said dose-delivering mouth (48; 48a; 48b) so as to sever said dose (D) from said extruder.
- 5 51. Apparatus according to claim 50, wherein said severing arrangement (46; 49; 49a) is mounted on said moulding unit (3; 3a).
52. Apparatus according to claim 50 or 51, wherein said severing arrangement (46) is rotatable around a
10 respective axis (Z2).
53. Apparatus according to claim 52, wherein said severing arrangement (46) is driven by an independent motor unit.
54. Apparatus according to any one of claims 50 to 53,
15 wherein said severing arrangement (46; 49; 49a) is provided with a blade (46) connected to a supporting member (11; 11a) of a supporting arrangement for supporting said dose (D) between said punch (5; 5a) and said cavity mould (4; 4a).
55. Apparatus according to any one of claims 50 to 53,
20 wherein said severing arrangement is provided with a knife (49; 49a) mounted on said punch (5; 5a) or on said cavity mould (4; 4a).
56. Apparatus, comprising a moulding unit having a punch and a cavity mould movable between an open position in which
25 said punch and said cavity mould are distanced apart from each other and receive a plurality of doses of plastics therebetween, and a closed position in which said punch and said cavity mould interact to form an item by pressing said plurality of doses (Da, Db).
- 30 57. Apparatus, comprising a moulding unit (3) having a punch (5) and a cavity mould (4) one of which serving as a receiving member for receiving a dose (D) of plastics in an open position, said moulding unit (3) being movable along a path between said open position and a closed
35 position in which said punch (5) and said cavity mould (4) interact to form an item by pressing said dose (D),

channel means (300) being provided to surround said receiving member in said open position along said path.

58. Apparatus according to claim 57, and comprising a further channel (303) which surrounds transferring means (8) for transferring said dose (D) from an extruder mouth (73) to said moulding unit (3), said further channel (303) extending along a further path leading towards said path.

59. Apparatus according to claim 59 or 60, and further comprising a supporting arrangement (11) extending externally of said moulding unit (3) and interposed between said punch (5) and said cavity mould (4) for supporting said dose (D).

60. Apparatus according to claim 59, wherein said supporting arrangement comprises a supporting member (11) of porous material.

61. Apparatus according to claim 59, wherein said supporting arrangement comprises a supporting member (211) having holes (212a) through which fluid can be injected toward said dose (D).

62. Apparatus according to claim 59, wherein said supporting arrangement comprises a supporting member of thermally substantially non-conductive material.

63. Apparatus, comprising a pair of rods (11) for supporting a dose (D) of plastics between a punch (5) and a cavity mould (4), said pair of rods (11) being actuatable by a cam arrangement (19) having a first portion (560) for driving said rods (11) in a dose-receiving position in which said dose (D) is received above said rods (11) and a second portion (561) for driving said rods (11) in a dose-pinching position in which said dose (D) is pinched between said rods (11), said second portion (561) being adjacent to said first portion (560).

64. Apparatus according to claim 63, wherein said first portion (560) and said second portion (561) are arranged in sequence along a direction (F), said punch (5) and/or

said cavity mould (4) being movable along said direction (F) to open or close said moulding unit (3).

5 65. Apparatus according to claim 63 or 64, wherein said cam arrangement (19) comprises a third portion (562) for driving said pair of rods (11) in a dose-delivering position in which said dose (D) is delivered between said punch (5) and said cavity mould (4).

10 66. Apparatus according to claim 65, as appended to claim 64, wherein said first portion (560), said second portion (561) and said third portion (562) are arranged in sequence along said direction (F).

15 67. Apparatus according to any one of claims 1 to 32, and/or to any one of claims 33 to 35, and/or to any one of claims 36 to 38, and/or to any one of claims 39 to 42, and/or to any one of claims 43 to 45, and/or to claim 46, and/or to claim 47, and/or to claim 48, and/or to any one of claims 49 to 55, and/or to claim 56, and/or to any one of claims 57 to 62, and/or to any one of claims 63 to 66.

20 68. A mould compression item comprising a body formed from a plurality of plastic materials having different properties and/or appearance from one another.

69. An item according to claim 68, wherein said plurality of plastic materials comprises first plastic material and second plastic material.

25 70. An item according to claim 69, wherein said first and second plastic materials define adjacent portions (251, 252; 312, 313; 316, 318) of a container closure (250; 311; 315).

30 71. An item according to claim 70, wherein said adjacent portions (312, 313) are arranged one inside another in said container closure (311).

72. An item according to claim 70, wherein said adjacent portions (251, 252; 316, 318) are arranged side by side in said container closure (250, 315).

35 73. An item according to claim 72, wherein a hinge (317) is obtained in one of said adjacent portions.

74. Method, comprising delivering a plurality of doses (Da, Db) of plastics to a moulding unit and pressing together said plurality of doses between a punch and a cavity mould.

5 75. Method for compression moulding of plastics items, comprising forming a dose of plastic material in a moulding unit by bringing together a punch and a cavity mould, wherein before said bringing together, said dose is propelled towards either said punch, or said cavity
10 mould.

76. Method for compression moulding of plastics items, comprising forming a dose (D) of plastics in a moulding unit (3) by bringing together a punch (5) and a cavity
15 mould (4), and further comprising, before said bringing together, resting said dose (D) on a pair of rods, moving said rods close to one another so as to pinch said dose (D), and delivering said dose (D) from said rods to said moulding unit (3), wherein between said
20 resting and said moving said dose (D) remains in contact with said rods.